

WHAT IS CLAIMED IS:

1. An image processing apparatus using dithering to represent shades, comprising:

a storage portion storing a basic dither pattern configured of a plurality of basic patterns;

5 a dithering unit using said basic dither pattern to dither image data, said plurality of basic patterns each including a plurality of pixels;

a first assignment portion assigning an initial value to a single pixel in one of said plurality of basic patterns as a number indicating an order to be followed to illuminate a dot in a dither matrix; and

10 a second assignment portion selecting from said basic patterns longitudinally and laterally arranged a basic pattern remotest from any pixel assigned a number, and assigning a subsequent number to a pixel in said basic pattern selected, wherein said second assignment portion repeats assignment to assign in said basic dither pattern a number indicating an
15 order to be followed to illuminate a dot.

2. The apparatus of claim 1, wherein in said basic pattern a number indicating an order to be followed to illuminate a dot is assigned to allow the dither matrix to be a dither matrix of dot convergence type.

3. The apparatus of claim 1, further comprising:

a third assignment portion assigning, when said basic dither pattern has all of its basic patterns each with a single pixel assigned a number, a subsequent number to a pixel adjacent to a pixel assigned a number by said
5 first assignment portion; and

a fourth assignment portion selecting from said basic patterns longitudinally and laterally arranged a basic pattern remotest from any basic pattern including a pixel assigned a number after said second assignment portion has performed said assignment, and assigning a
10 subsequent number to a pixel adjacent to a pixel in that basic pattern that is assigned a number, wherein said fourth assignment portion repeats

assignment to assign in said basic dither pattern a number indicating an order to be followed to illuminate a dot.

4. The apparatus of claim 1, further comprising a table storage portion storing a table correlating a shade of said image data to a shade in a basic dither pattern, wherein said dithering unit uses said basic dither pattern and said table to dither image data.

5. The apparatus of claim 4, further comprising an image forming unit forming an image based on image data dithered by said dithering unit.

6. The apparatus of claim 5, further comprising:
a detector detecting a density of a pattern formed by said image forming unit; and
a table modification portion driven by the density detected by said
5 detector to modify said table.

7. An image processing method employing dithering to represent shades, the method using a basic dither pattern configured of a plurality of basic patterns each including a plurality of pixels, the method comprising:
an initial assignment step of assigning an initial value to a single
5 pixel in one of said plurality of basic patterns as a number indicating an order to be followed to illuminate a dot in a dither matrix;
a second assignment step of selecting from said basic patterns longitudinally and laterally arranged a basic pattern remotest from any pixel assigned a number, and assigning a subsequent number to a pixel in
10 said basic pattern selected, repeatedly to assign in said basic dither pattern a number indicating an order to be followed to illuminate a dot; and
a step of storing to a storage portion a basic dither pattern assigned a number indicating an order to be followed to illuminate a dot.

8. The method of claim 7, wherein in said basic pattern a number indicating an order to be followed to illuminate a dot is assigned to allow

the dither matrix to be a dither matrix of dot convergence type.

9. The method of claim 7, further comprising:

5 a third assignment step assigning, when said basic dither pattern has all of its basic patterns each with a single pixel assigned a number, a subsequent number to a pixel adjacent to a pixel assigned a number at the first assignment step; and

10 a fourth assignment portion selecting from said basic patterns longitudinally and laterally arranged a basic pattern remotest from any basic pattern including a pixel assigned a number after the second assignment step has been performed, and assigning a subsequent number to a pixel adjacent to a pixel in that basic pattern that is assigned a number, repeatedly to assign in said basic dither pattern a number indicating an order to be followed to illuminate a dot.

10. An image processing program product causing a computer to perform an image process representing shades using dithering employing a basic dither pattern configured of a plurality of basic patterns each including a plurality of pixels, the product causing the computer to execute:

5 an initial assignment step of assigning an initial value to a single pixel in one of said plurality of basic patterns as a number indicating an order to be followed to illuminate a dot in a dither matrix;

10 a second assignment step of selecting from said basic patterns longitudinally and laterally arranged a basic pattern remotest from any pixel assigned a number, and assigning a subsequent number to a pixel in said basic pattern selected, repeatedly to assign in said basic dither pattern a number indicating an order to be followed to illuminate a dot; and

a step of storing to a storage portion a basic dither pattern assigned a number indicating an order to be followed to illuminate a dot.

11. The product of claim 10, wherein in said basic pattern a number indicating an order to be followed to illuminate a dot is assigned to allow the dither matrix to be a dither matrix of dot convergence type.

12. The product of claim 10, causing the computer to further execute:

5 a third assignment step assigning, when said basic dither pattern has all of its basic patterns each with a single pixel assigned a number, a subsequent number to a pixel adjacent to a pixel assigned a number at the first assignment step; and

10 a fourth assignment portion selecting from said basic patterns longitudinally and laterally arranged a basic pattern remotest from any basic pattern including a pixel assigned a number after the second assignment step has been performed, and assigning a subsequent number to a pixel adjacent to a pixel in that basic pattern that is assigned a number, repeatedly to assign in said basic dither pattern a number indicating an order to be followed to illuminate a dot.

13. An image processing apparatus using dithering to represent shades, comprising

a storage portion storing a basic dither pattern configured of a plurality of basic patterns; and

5 a dithering unit using said basic dither pattern to dither image data, wherein

said plurality of basic patterns each including a plurality of pixels,

said basic dither pattern has each pixel assigned a number indicating an order to be followed to illuminate a dot in a dither matrix,

10 a single pixel in one of said plurality of basic patterns is assigned an initial value of said number, and

15 subsequently when said basic patterns are arranged longitudinally and laterally a basic pattern remotest from any pixel assigned a number is selected in order and a pixel in that selected basic pattern is assigned a subsequent number.

14. The apparatus of claim 13, wherein in said basic pattern a number indicating an order to be followed to illuminate a dot is assigned to allow the dither matrix to be a dither matrix of dot convergence type.

15. The apparatus of claim 13, further comprising a table storage portion storing a table correlating a shade of said image data to a shade in a basic dither pattern, wherein said dithering unit uses said basic dither pattern and said table to dither image data.

16. The apparatus of claim 15, further comprising an image forming unit forming an image based on image data dithered by said dithering unit.

17. The apparatus of claim 16, further comprising;
a detector detecting a density of a pattern formed by said image forming unit; and

5 a table modification portion driven by the density detected by said detector to modify said table.